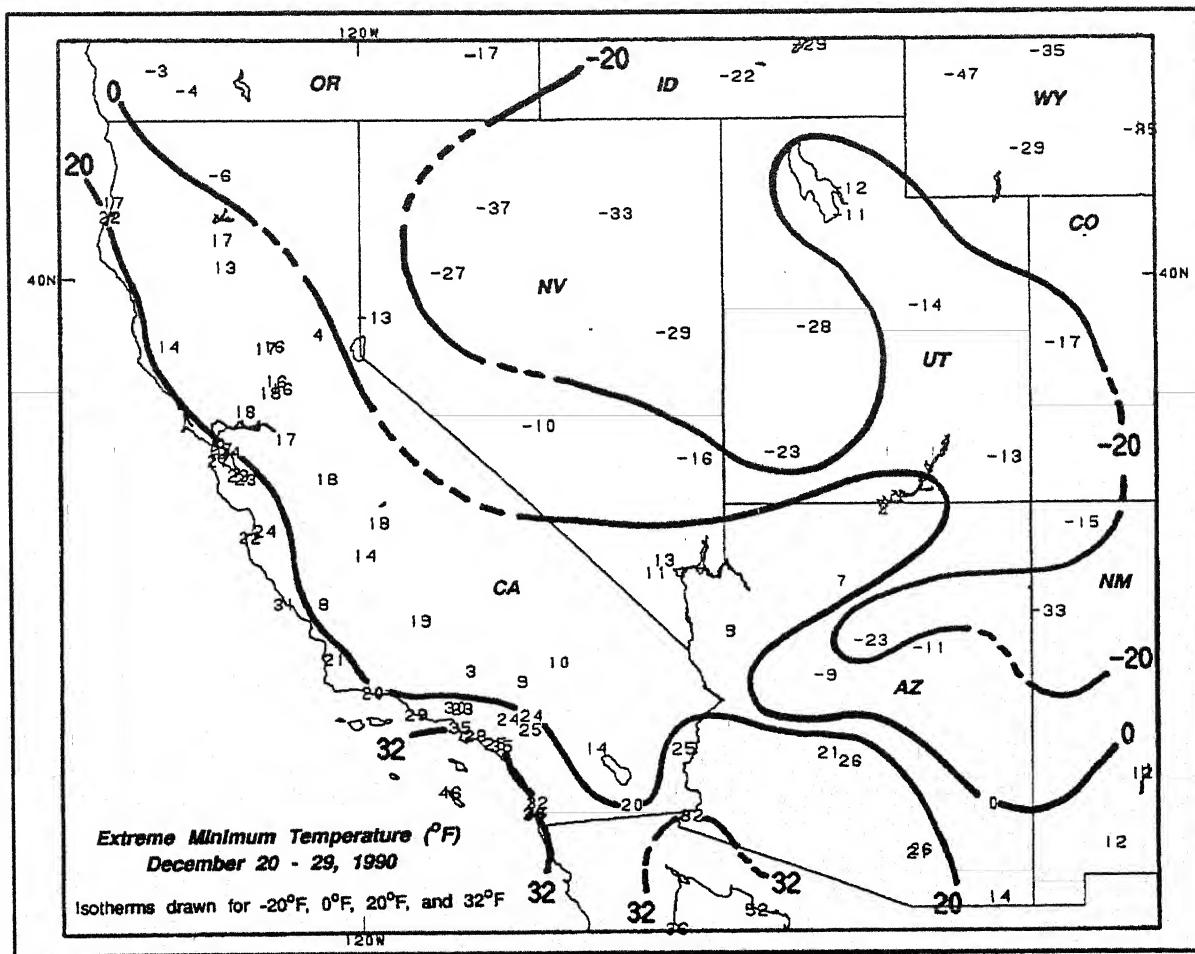


WEEKLY CLIMATE BULLETIN

No. 90/52

Washington, DC

December 29, 1990



Frigid Arctic air covered much of the western half of the nation for the second consecutive week. Since Dec. 20, hundreds of stations have set daily minimum temperature extremes, several have established record December lows, and a few have reported all-time record cold. Especially hard hit was California where

temperatures plunged below freezing along the coast and into the teens and lower twenties in prime agricultural areas. According to press reports, this was the worst freeze in California since the 1936-1937 growing season, resulting in extensive damage to the state's fruit and vegetable crop, particularly the navel orange crop, with total losses estimated at \$1 billion.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *U.S. cooling degree days (summer) or heating degree days (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF DECEMBER 29, 1990

1. Southern Canada and the Western U.S.:

COLD AIR REMAINS ENTRENCHED ACROSS REGION.

Temperatures averaged 5°C to 13°C below normal, with the largest departures afflicting the southern Rockies, Great Basin, and northern Intermountain West. Temperatures dropped as low as -40°C in spots, with gusty winds sending wind chills as low as -70°C [2 weeks].

2. The Midwest and Northeast:

SUPERFLUOUS PRECIPITATION PERSISTS FOR MORE THAN A MONTH.

Since late November, persistently above normal precipitation, combined with recent snowmelt, has generated numerous flooding problems across much of the Ohio Valley, lower Great Lakes, and central Appalachians. During the period, 125-250 mm of precipitation has fallen across the Northeast, lower Great Lakes, and Ohio Valley while 250-490 mm has been measured across the middle Mississippi and Tennessee Valleys. Isolated locations have accumulated up to 315 mm of excess precipitation since mid-November, with most locations reporting 60-130 mm of surplus precipitation during the period [5 weeks].

3. Central South America:

RAINFALL SLACKENS.

Only 15-35 mm of rain fell on western sections, with little or none measured elsewhere; however, large rainfall surpluses (65-180 mm during the past 6 weeks) have persisted since mid-November, and continued dry weather is needed to eliminate widespread, excessive moisture [9 weeks].

4. Northern and Eastern Africa:

WARM SPELL FINALLY ENDS IN WESTERN SAHEL, CONTINUES ELSEWHERE.

A second consecutive week of seasonable temperatures brought an end to the prolonged spell of warm weather in that region, but considerably above normal temperatures (departures of +3°C to +7°C) continued across the central and eastern Sahel and Egypt [20 weeks west; 7 weeks east].

5. Southeastern Africa:

CONTINUED LIGHT TO MODERATE RAINFALL.

Moderate rains (35-100 mm) brought an end to moisture deficits across most of Zambia and southern Tanzania. Farther south, up to 70 mm of rain decreased deficits across eastern Zimbabwe while 10-30 mm brought limited relief to other areas. Despite the recent rains, sizable shortfalls continue to plague many areas, particularly in southern sections [13 weeks].

6. Japan and East-Central Asia:

PROLONGED WARM SPELL ENDS.

Weekly departures around +3°C were observed across Hokkaido, but near normal temperatures elsewhere finally brought an end to the warm spell after nearly five months [Ended after 20 weeks].

7. The Philippines and Southeast Asia:

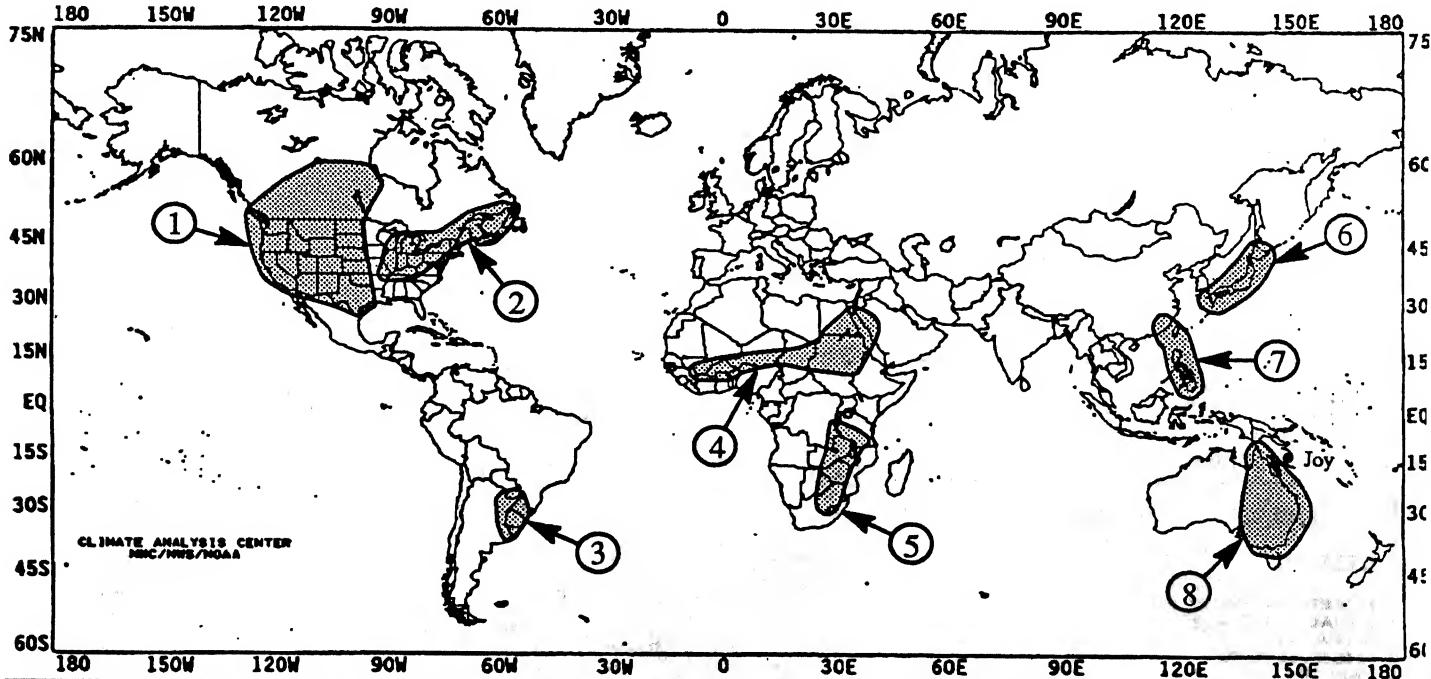
ABNORMALLY DRY CONDITIONS DEVELOP.

Precipitation deficits have been slowly climbing during the past several weeks as drier than normal conditions persisted. Deficits since mid-November range between 80-450 mm. Last week brought 50-100 mm of rain to portions of the west-central Philippines, 15-30 mm across northern Mindanao, and little or none elsewhere [7 weeks north; 4 weeks south].

8. Eastern Australia:

TYphoon JOY INUNDATES NORTHERN COASTAL AREAS WHILE SOUTHERN AND WESTERN AREAS REMAIN TOO DRY.

Tropical Cyclone Joy meandered along the Queensland coast as it slowly lost strength, dumping 500-700 mm of rain across eastern Queensland from Mackay southeastward to Rockhampton and 75-200 mm along the remainder of coastal Queensland. The storm brought strong wind gusts and widespread coastal and lowland flooding to the region, according to press reports [Episodic Event]. In sharp contrast, most locations farther inland received little or no rain, with the heaviest amounts (15-30 mm) falling on southeastern Queensland. Since mid-November, rainfall deficits of 60-110 mm have accumulated across central and western Queensland, New South Wales, and interior Victoria [12 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF DECEMBER 23 - DECEMBER 29, 1990

The first full week of Winter saw a continuance of bitterly cold conditions across much of the central and western U.S. while the eastern third of the country basked under unseasonably warm weather. Numerous record highs were observed in the East from the Gulf Coast states to northern New England early and late in the week. Tampa, FL reported a high temperature of 85°F on Saturday, marking the thirteenth time this month that the mercury has exceeded 80°F and the seventh daily record high established or tied during December. In sharp contrast, frigid Arctic air continued to grip much of the western half of the country. Dozens of record lows were reported from coastal California to the upper Great Lakes. Up to 125 locations across the nation reported record low minimum and/or maximum temperatures on Christmas day. On Wednesday, Sacramento, CA recorded their seventh consecutive record low temperature. Frosts and hard freezes extended southward to southern California and the desert Southwest. According to press reports, the California fruit and vegetable crop sustained extensive damage (losses estimated at \$1 billion) when temperatures dropped into the teens and lower twenties, producing the worst freeze since the 1936-1937 growing season. A spokesman for the California Farm Bureau stated that the freeze was particularly ill-timed for the state's navel orange crop since the fruit was late in maturing partly due to the region's four-year drought. Elsewhere, portions of the Great Lakes and Northeast were blanketed with up to 10 inches of snow on Christmas while heavy rains produced localized flooding across parts of the Tennessee Valley and central Gulf Coast States. Farther north, a warm spell commenced across parts of southern Alaska, with Kodiak reporting a record high of 47°F on Tuesday. The high temperatures and rain rapidly melted the snow cover in Juneau, causing some flooding around the city.

The week began with a cold front stretched from northern New England to the Gulf Coast. Ahead of the cold front, record warmth streamed northward from Georgia to southern Maine while heavy rain and thunderstorms pounded parts of the Deep South and Tennessee Valley. The front eventually tracked off the Atlantic Coast, bringing much colder conditions to the eastern U.S. Farther west, a dome of high pressure brought bitterly cold and dry conditions to the central and western portions of the U.S. Numerous daily record lows were observed across much of the western two-thirds of the country. Some locations reported the lowest readings ever while many other stations observed record low December temperatures. Albuquerque, NM reported their first sub-zero December temperature, and Boise, ID recorded 4 consecutive days when the temperature dropped between -20°F and -25°F. Highs on Tuesday remained below zero from eastern Montana to Minnesota. A fast-moving cold front tracked across the northern U.S., dumping snow on portions of the Great Lakes and western New York. Behind the front, a reinforcing shot of Arctic air settled across the northern Plains and upper Mississippi Valley.

During the latter half of the week, a weak storm system located over the central Gulf Coast and a second low off the Eastern Seaboard spread mixed precipitation across the lower and middle Mississippi Valley, rain across parts of the Ohio Valley, and heavy snow from the mid-Atlantic to the Northeast. Up to a foot of snow was reported in western Pennsylvania. By the week's end, dense fog shrouded parts of the East as warm air

slowly pushed northward over snow-covered ground east of the Appalachians, reducing visibilities to zero at some locations. West of the Appalachians, more daily record highs were reported from Mississippi to New York. Farther north, another blast of frigid Arctic air invaded the northern Rockies and Plains behind a strong cold front. Numerous daily record lows were established from Nebraska to Washington. Blizzard conditions covered much of eastern Montana and northwestern North Dakota as heavy snow and high winds blasted the region. Extremely dangerous wind chills of -70°F and lower were observed across parts of Montana and South Dakota. The front pushed rapidly eastward into the Mississippi Valley, glazing sections of Missouri with sleet and freezing rain. Up to 2 1/2 inches of ice covered the ground at Aurora while several other locations were coated with an inch. On Saturday, flood warnings were issued for parts of the central and eastern Corn Belt due to the combination of heavy rains and rapidly melting snow cover (Figure 1). Farther west, frost warnings were issued for parts of the agricultural regions near San Diego, CA as another blast of frigid air pushed southward across California.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) occurred along portions of the central Gulf Coast, in the eastern Tennessee, northern Ohio, and lower Mississippi Valleys, lower Great Lakes, mid-Atlantic, throughout the Appalachians, in parts of Hawaii, and along the southern coast of Alaska (Table 1). Light to moderate amounts were recorded along the northern half of the Pacific Coast, in parts of the northern and southern Rockies, southern Great Plains, and across most of the eastern half of the country. Little or no precipitation was observed along the southern half of the Pacific Coast, throughout the Intermountain West, central and northern Plains, southern High Plains, and along sections of the southern Atlantic Coast.

Unseasonably mild conditions prevailed east of the Appalachians despite a mid-week intrusion of cold air. Weekly temperature departures of +5°F to +8°F were common across the northern half of New England as highs soared into the sixties as far north as southeastern Maine. Abnormal warmth also covered most of the Florida with readings soaring into the upper eighties in the southwestern part of the state while weekly temperatures averaged up to 10°F above normal. Farther north, conditions have dramatically changed across most of Alaska. November's and early December's frigid weather has been replaced by exceptionally mild air, with weekly departures up to +25°F observed in southern Alaska (Table 2).

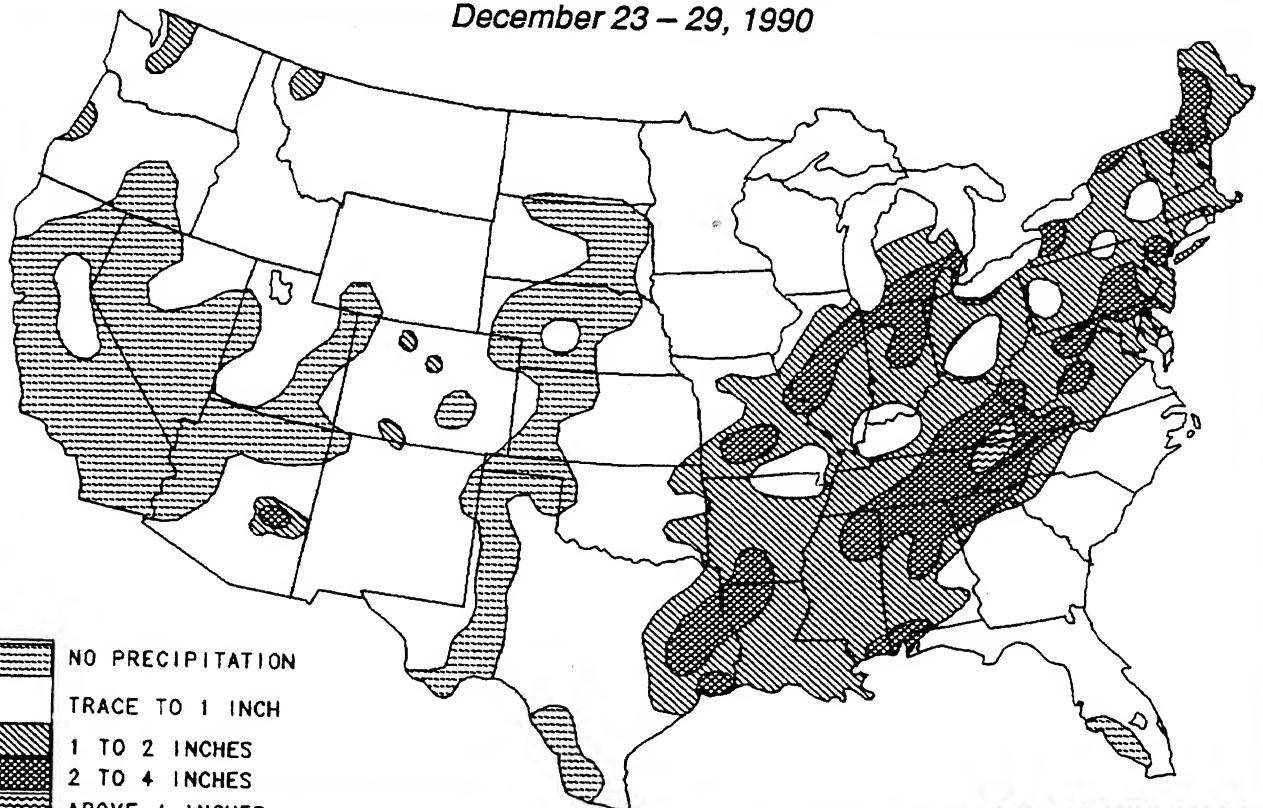
In sharp contrast, bitterly cold conditions affected the western three-quarters of the nation. Temperatures dropped to -30°F and lower across portions of the northern Plains and Rockies, and sub-zero readings were common from the Midwest to the Intermountain West. Most of the nation experienced freezing temperatures with the exception of central and southern Florida and a few locations along the southern coast of California. Weekly departures of -20°F and lower were observed from North Dakota to Nevada while departures between -10°F and -20°F were common west of the Mississippi River and north of 35°N latitude (Table 3). Elsewhere, weekly temperatures averaged slightly below normal west of the Appalachians, in Hawaii, and extreme western Alaska.

TABLE 1. Selected stations with 2.50 or more inches of precipitation for the week.

STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
KOKEE, KAUAI, HI	7.32	DECATUR, IL	2.79
KAHALUI, MAUI, HI	4.72	SOUTH BEND, IN	2.76
SITKA, AK	4.59	CLEVELAND/HOPKINS, OH	2.74
KNOXVILLE, TN	4.14	ASHEVILLE, NC	2.69
YAKUTAT, AK	3.71	STAMPEDE PASS, WA	2.67
CHATTANOOGA, TN	3.33	JACKSON, MI	2.63
BUFFALO, NY	3.02	MCGRATH, AK	2.61
BOSSIER CITY/BARKSDALE AFB, LA	2.94	SPRINGFIELD, MO	2.61
LONDON/CORBIN, KY	2.90	FORT WAYNE, IN	2.53
COLD BAY, AK	2.86	SHREVEPORT, LA	2.50
COLUMBUS AFB, MS	2.82	CENTERVILLE, GA	2.50
LAFAYETTE, IN	2.80	NIAGARA FALLS, NY	2.50

OBSERVED PRECIPITATION

December 23 – 29, 1990



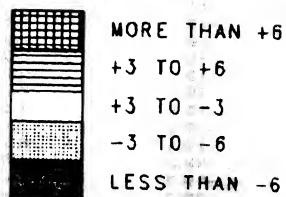
CLIMATE ANALYSIS CENTER / NOAA

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

December 23 – 29, 1990



DEPARTURES (°F)



CLIMATE ANALYSIS CENTER / NOAA

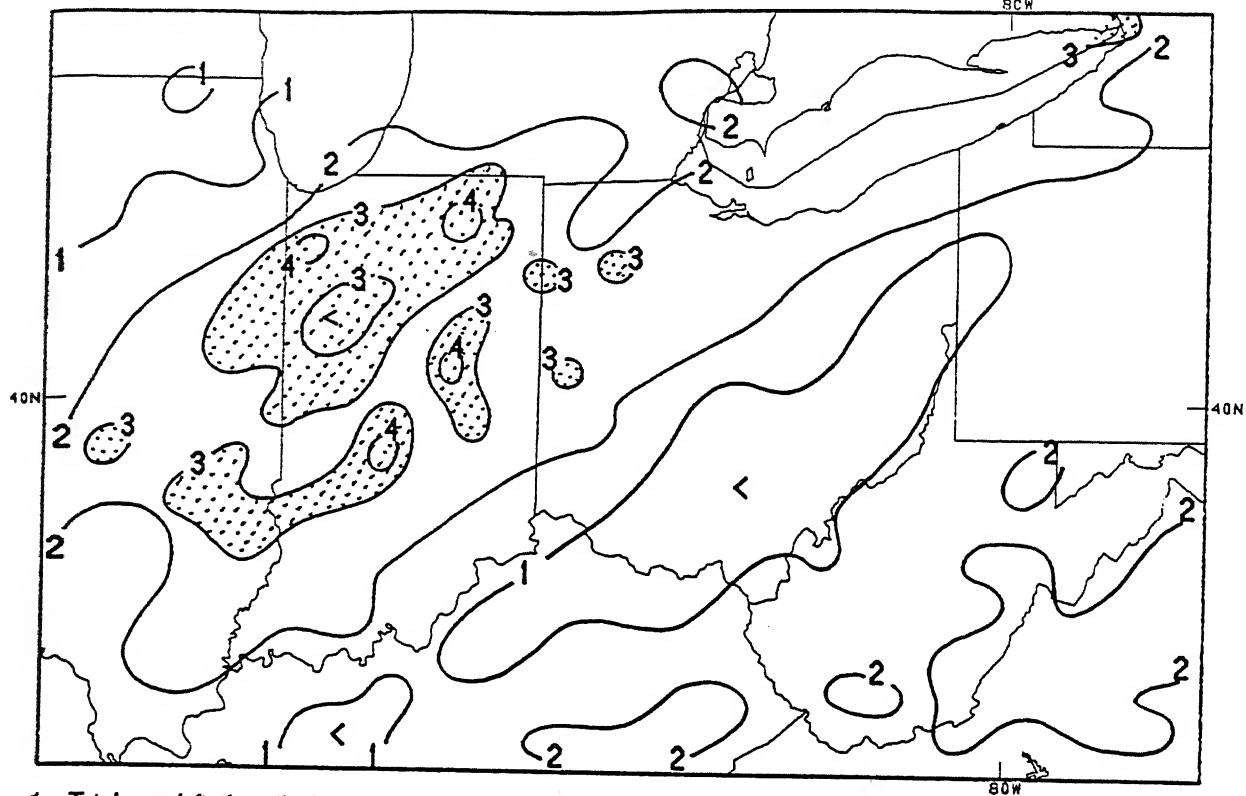


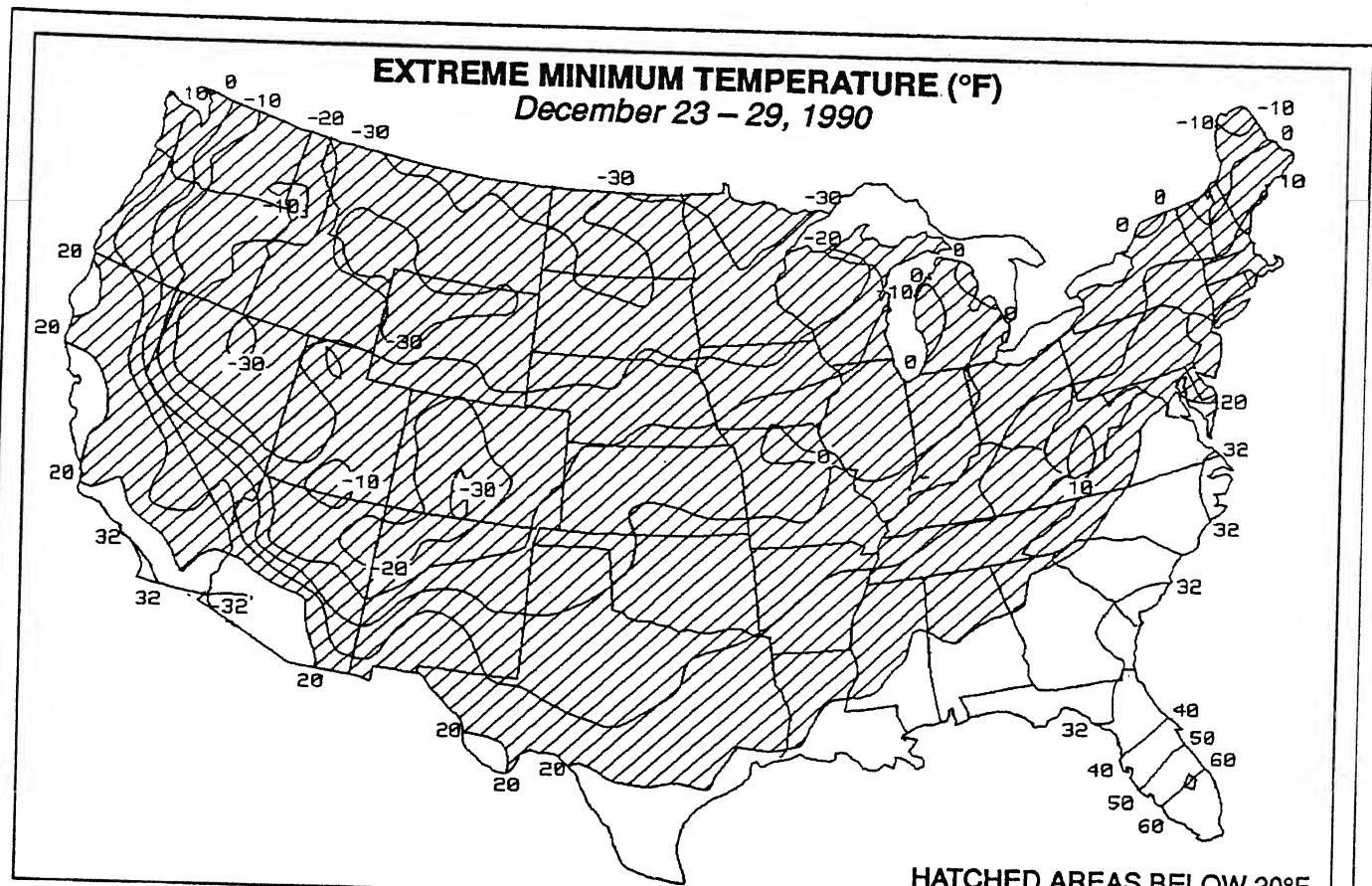
Figure 1. Total precipitation (inches) during the week of Dec. 23-29, 1990 based upon first-order synoptic, airways, and the River Forecast Centers stations. Isohyets are drawn for 1, 2, 3, and 4 inches, and stippled areas are more than 3 inches. Towards the week's end, heavy rains fell on top of ample snow cover and saturated ground, producing severe flooding across portions of the central and eastern Corn Belt and central Appalachians.

TABLE 2. Selected stations with temperatures averaging 8.0°F or more ABOVE normal for the week.

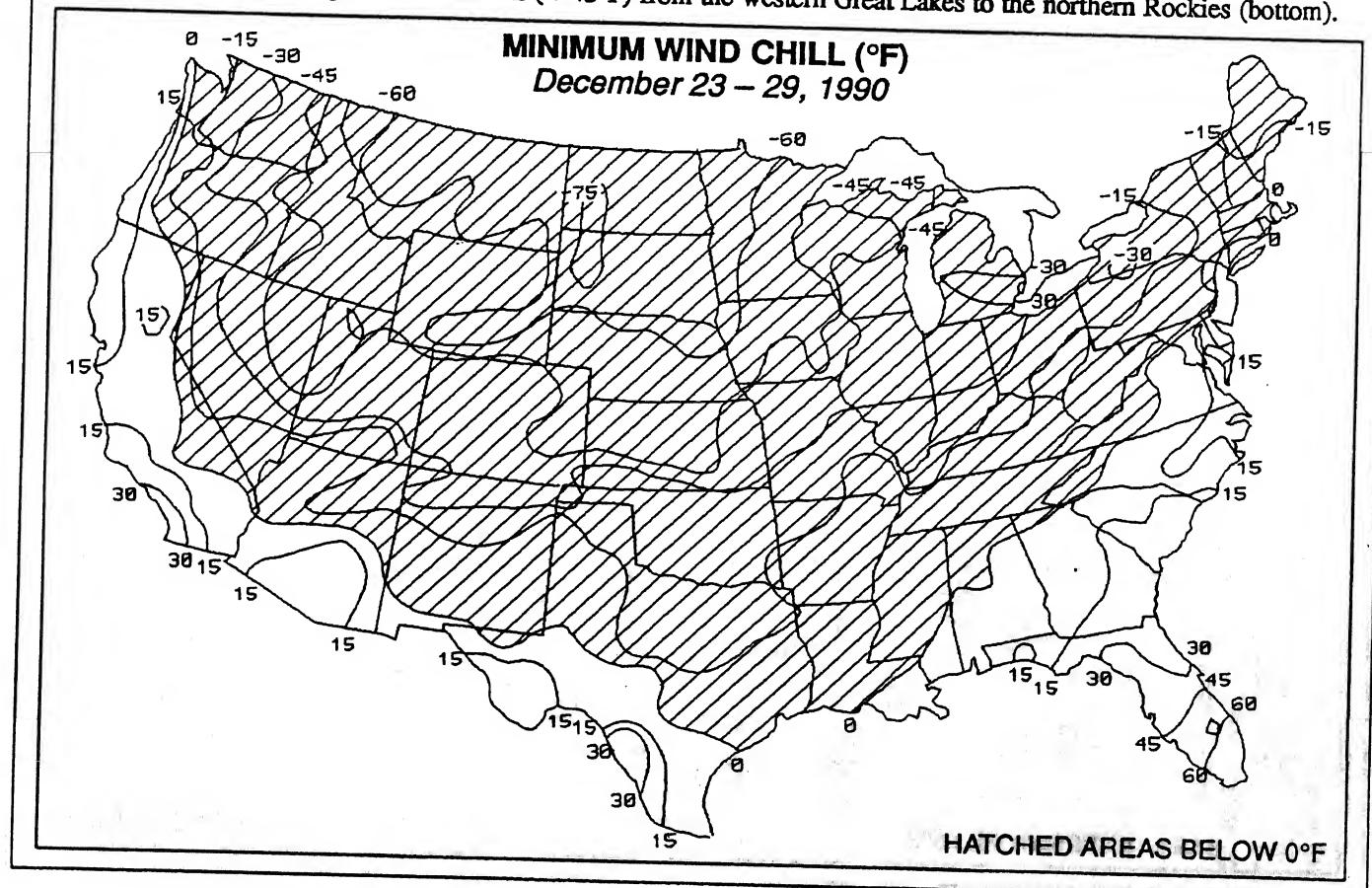
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
MCGRATH, AK	+25.1	13.6	TALKEETNA, AK	+11.5	19.1
NORTHWAY, AK	+23.8	3.4	CAPE HATTERAS, NC	+10.5	57.6
BETHEL, AK	+23.7	27.0	VERO BEACH, FL	+10.3	72.5
KING SALMON, AK	+22.2	32.8	ANCHORAGE, AK	+10.1	22.5
FAIRBANKS, AK	+19.3	6.9	FORT MYERS, FL	+10.0	73.8
ILIAMNA, AK	+17.8	30.0	MELBOURNE, FL	+9.6	71.5
GULKANA, AK	+17.3	8.8	KODIAK, AK	+9.3	38.6
BIG DELTA, AK	+13.9	7.3	VALDEZ, AK	+8.9	26.9
KENAI, AK	+13.7	23.7	KOTZEBUE, AK	+8.9	3.7
COLD BAY, AK	+12.5	41.2	TAMPA, FL	+8.5	68.8
NOME, AK	+12.4	15.7	MIAMI, FL	+8.4	76.1
HOMER, AK	+12.0	32.8	WEST PALM BEACH, FL	+8.4	74.5

Selected stations with temperatures averaging 19.0°F or more BELOW normal for the week.

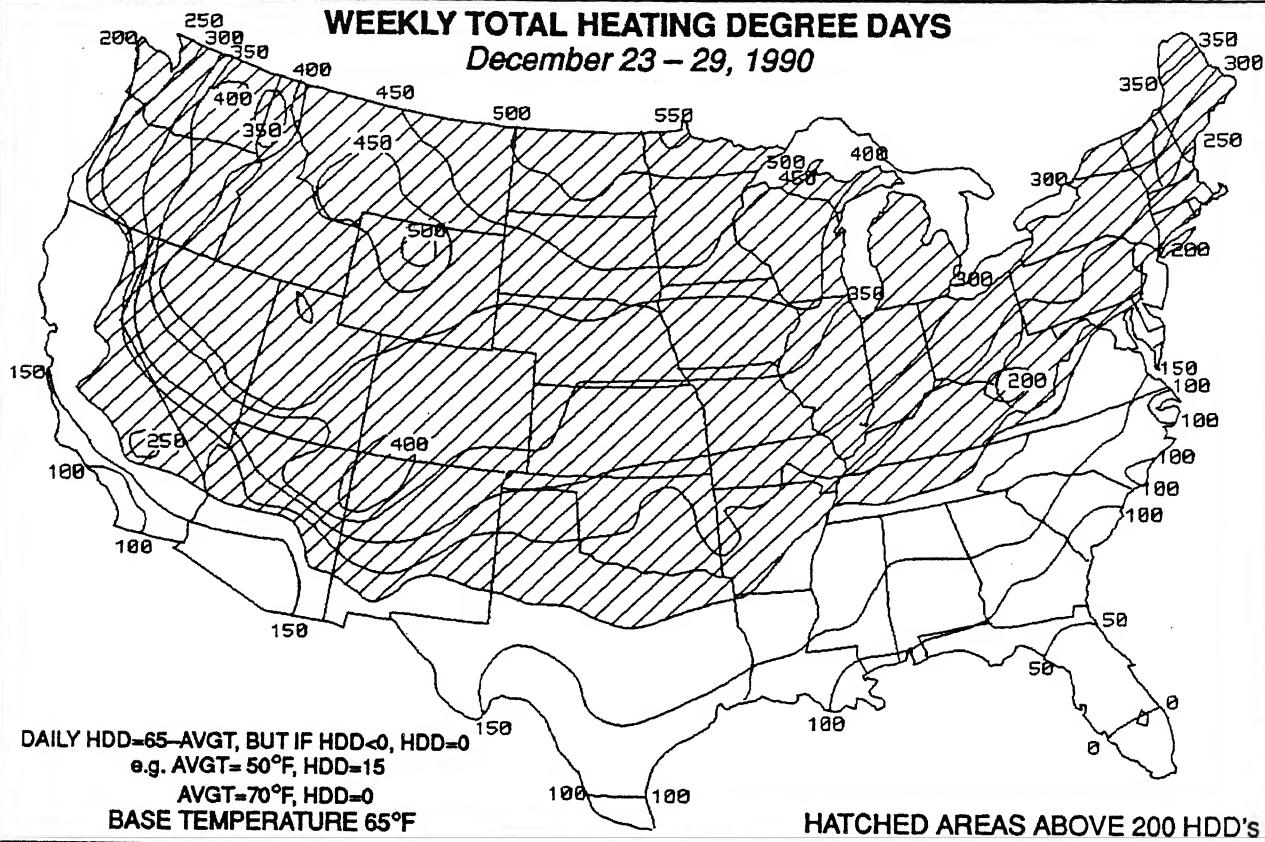
DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
-28.5	1.9	KALISPELL, MT	-20.3	2.2
-24.5	4.7	OGDEN/HILL AFB, UT	-20.2	7.7
-23.6	0.8	GREAT FALLS, MT	-19.9	3.7
-23.5	2.4	WILLISTON, ND	-19.8	-7.9
-23.5	5.9	SALT LAKE CITY, UT	-19.7	8.9
-22.8	-6.6	DICKINSON, ND	-19.7	-4.3
-22.6	7.1	BISMARCK, ND	-19.7	-8.0
-22.2	2.6	YAKIMA, WA	-19.7	10.2
-22.2	7.3	GILLETTE, WY	-19.6	3.7
-22.1	5.5	RAPID CITY, SD	-19.6	4.3
-22.0	-0.8	LEWISTOWN, MT	-19.5	2.4
-21.8	7.9	GLASGOW, MT	-19.4	-6.2
-21.7	-0.5	CASPER, WY	-19.3	4.8
-21.2	3.8	MILES CITY, MT	-19.3	-0.9
-21.0	13.5	SPokane, WA	-19.2	8.4
-20.9	7.3	CHEYENNE, WY	-19.1	9.4
-20.5	-0.7	WINSLOW, AZ	-19.1	12.4
-20.5	14.3	SHERIDAN, WY	-19.0	3.8



Frigid Arctic air continued to cover much of the central and western U.S. for the second consecutive week, dropping temperatures below 0°F from the upper Midwest to the Pacific Northwest (top). Strong winds accompanied the cold air, producing extremely dangerous wind chills (<-45°F) from the western Great Lakes to the northern Rockies (bottom).

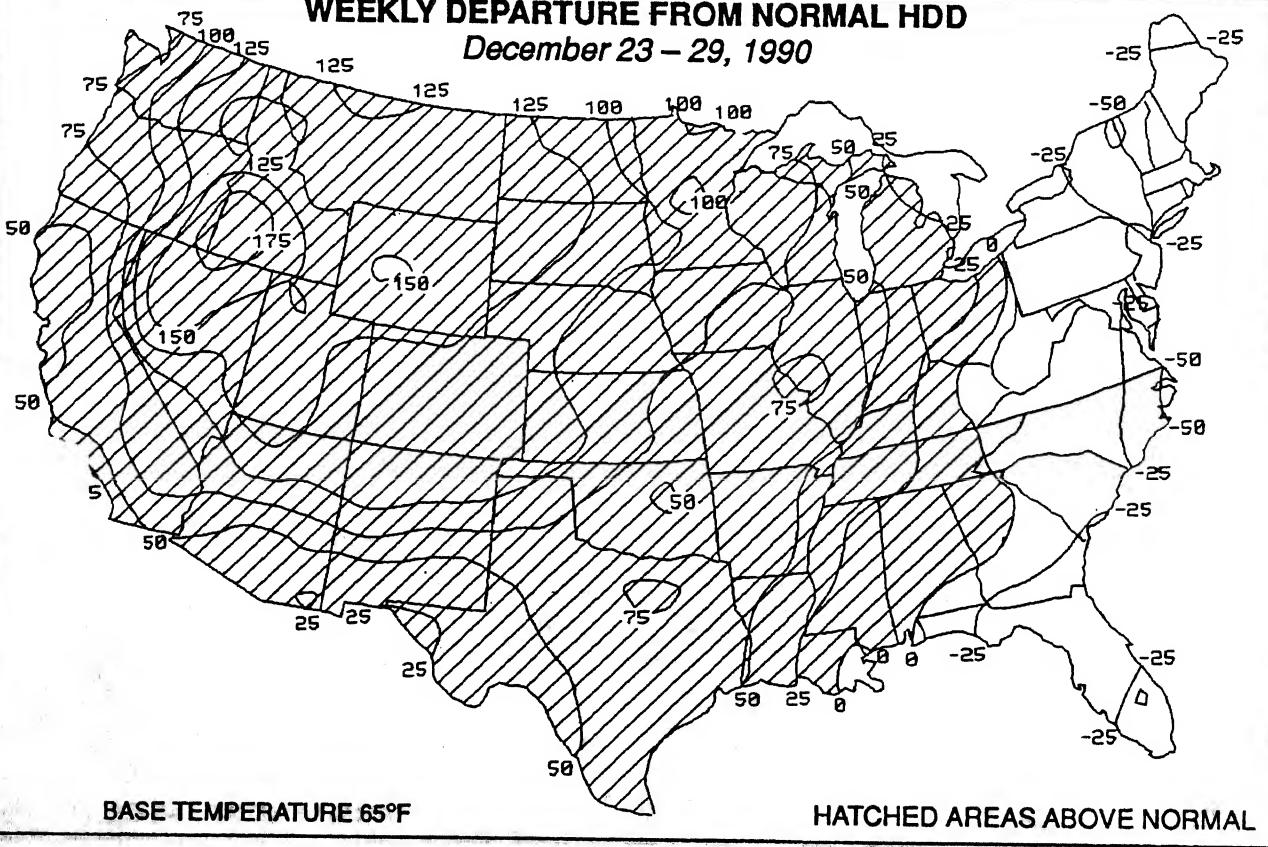


WEEKLY TOTAL HEATING DEGREE DAYS
December 23 – 29, 1990



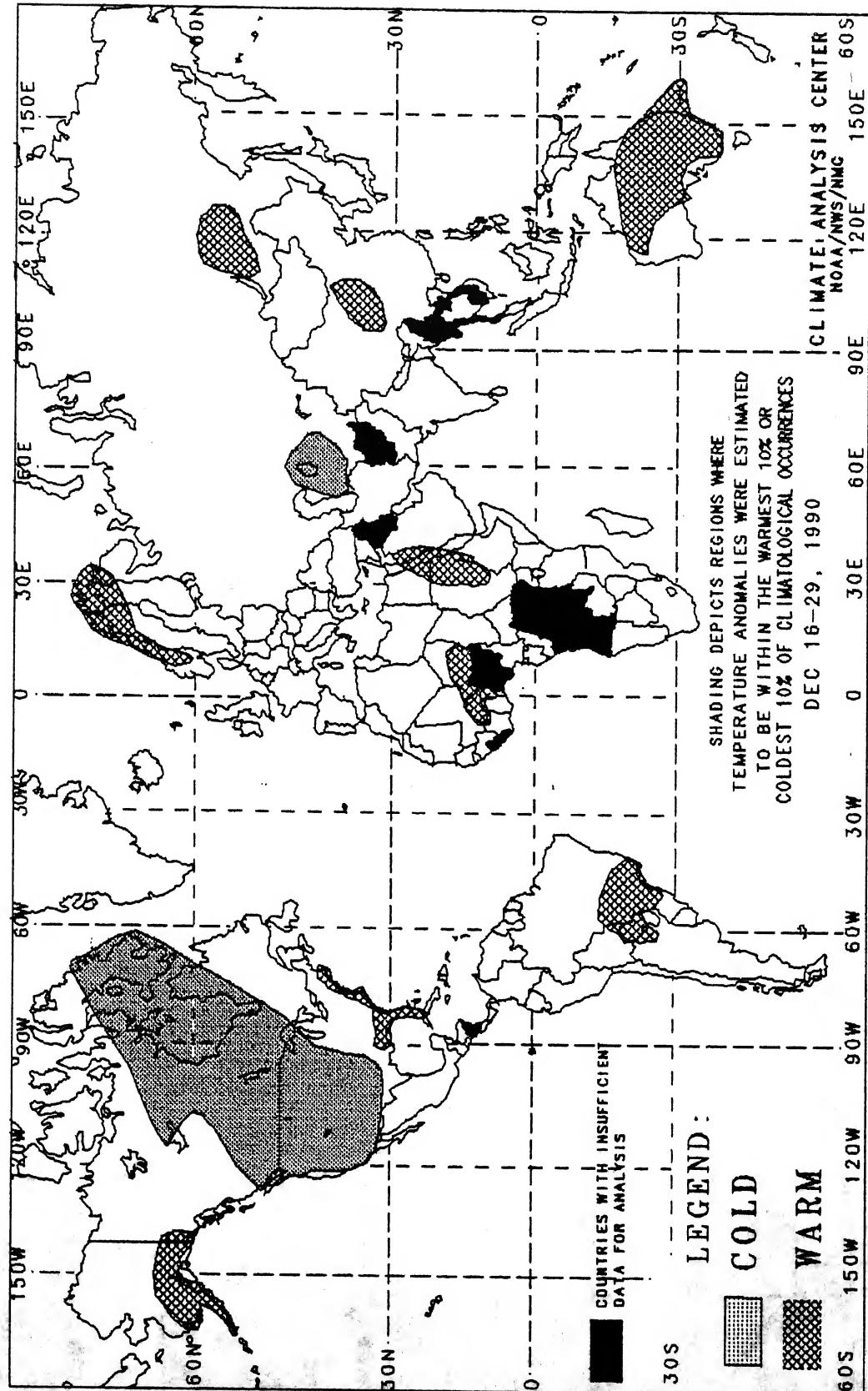
Another cold week produced excessively large heating requirements (>300 HDD's) across the northern half of the country (top). The western two-thirds of the nation experienced much above normal weekly heating demand due to frigid conditions while subnormal heating usage covered much of the eastern third of the U.S. as unseasonably mild conditions prevailed.

WEEKLY DEPARTURE FROM NORMAL HDD
December 23 – 29, 1990



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

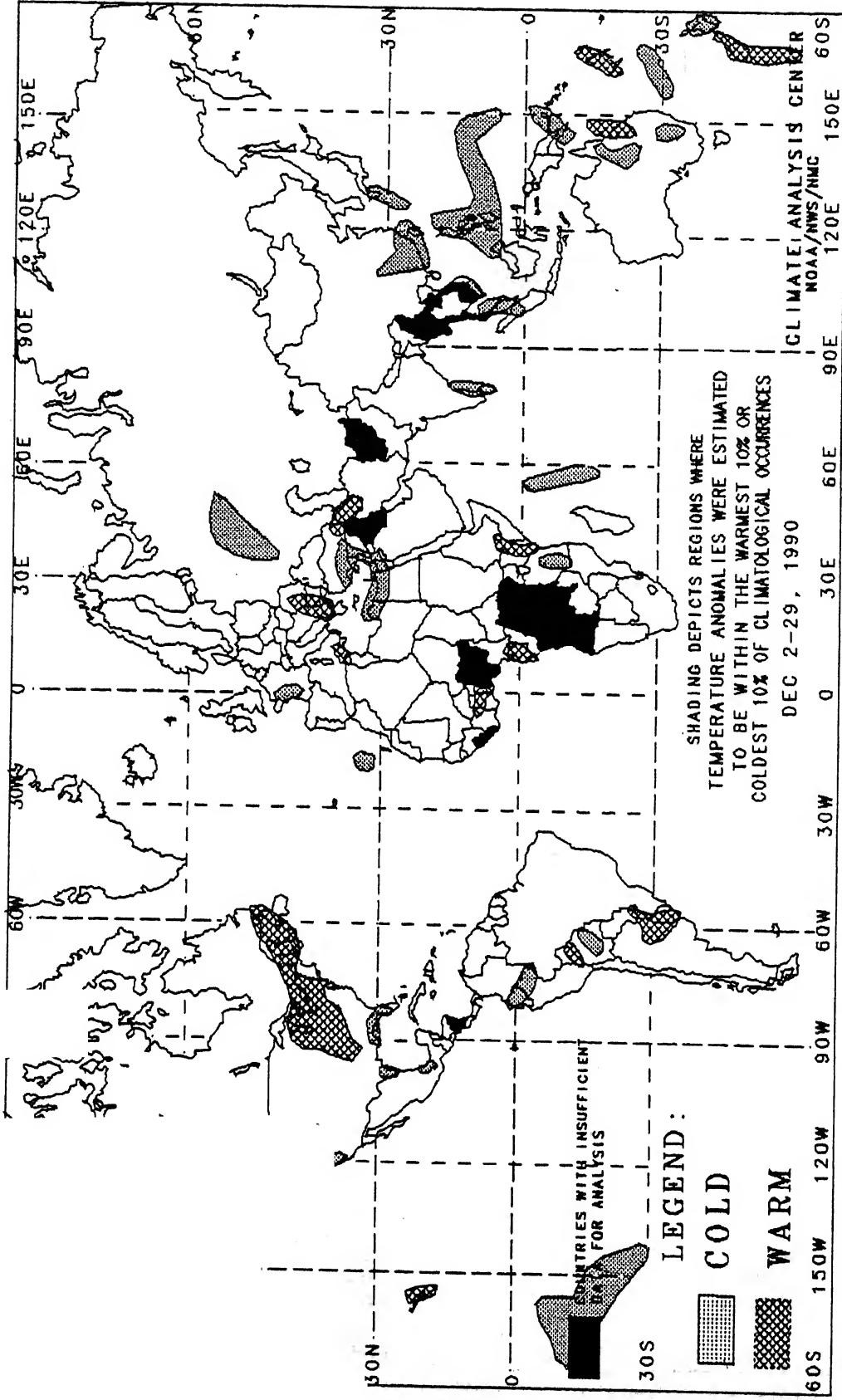
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

OBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

